Does corruption affect suicide? Empirical evidence from OECD countries

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Abstract

The question to what extent corruption influences suicide remains still unanswered. This paper examines the effect of corruption on suicide using a panel data approach for 24 OECD countries over the period 1995-2004. Our results show that suicide rates are lower in countries with lower levels of corruption. We also find evidence that this effect is approximately three times larger for males than for females. It follows from these findings that corruption has a detrimental effect on societal well-being and its effect differs based on the social position of genders.

Running title: Corruption and suicide in OECD countries

Keywords*:* Corruption, Panel data, Suicide, Well- Being, OECD

JEL classification*:* D73, H75, I18

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Introduction

Ideally, governments can be expected to improve quality of life and increase well-being by preventing market failure. Indeed, if the ultimate goal of any government is the continuous improvement of quality of life for its citizens, through a sustainable economic growth path for the macroeconomy, then government policies and practices should be targeting individual well-being. In the real world, this does not hold true. Since the seminal work of Mauro (1995) showing that corruption hampers economic growth, a growing number of studies have investigated the impact of corruption on various facets of society[4]. Recently, researchers have paid attention to a more fundamental issue by examining the association between governance and well-being (Helliwell and Huang 2008; Fischer and Rodríguez 2008; Ott 2010, among others).

Self-reported measures of subjective well-being are often criticized for lack of reliability and validity (for example, Bertrand and Mullainathan 2001). Koivumaa *et al*. (2001) provide evidence that there is a high correlation between suicide and subjective well-being at individual and aggregate levels. Unlike self-reported measures, suicide data[5] are more frequently used in cross-country comparisons. Self-reported data comparisons are difficult because of problems with interpersonal comparisons of utility. Indeed, Daly and Wilson (2009), using data for the United States, assert that well-being and suicide rates share common determinants. Thus, suicide rate is thought to be an appropriate proxy for societal well-being. Using suicide rates as an indicator of societal well-being has a great advantage in that this measure represents a more reliable and objective indicator of well-being compared to self-reported well-being measures (Helliwell 2007).

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[4] For instance, it has been found that corruption has a detrimental effect on the damage from natural disasters (Kahn 2005; Escaleras *et al.* 2007). Corruption causes traffic accidents (Anbarci *et al.* 2006). Corruption is negatively related to access to improved drinking water and adequate sanitation (Anbarci *et al.* 2009).

[5] The term suicide refers to completed suicides throughout this paper, unless noted otherwise.

Apart from researches of corruption and subjective well-being, economists also claim that suicidal behavior cannot be perfectly explained by social factors or psychiatric illness but may involve rational economic decision making (e.g., Hamermersh 1974; Hamermersh and Soss 1974). The empirical literature has also relied on the theory of social integration by Durkheim (1966). The economic and sociological approaches of suicide motivate many of the control variables employed in a variety of econometric studies of macro level determinants of suicide (see. However, few researchers have attempted to examine the association between suicide and the quality of governance. In the present study, we investigate the effect of corruption on suicide rates. In addition, we examine the existence of a gender effect on suicide rates, as the determinants could differ across genders.(e.g. Andrés 2005; Chuang and Huang 2007; Minoiu and Andrés 2008; Yamamura, 2010). Understanding the gender differences may also be important in informing appropriate policy formulations[6]. For this purpose, we employ a fixed effects model to conduct estimation for 24 OECD countries covering 1995-2004. In what follows, we present the theoretical background and hypothesis. Next, data and empirical model and estimation results are exhibited. The paper concludes with a summary of our findings.

Theoretical background and hypothesis

Corruption arguably impacts the efficiency of government policies and practices by distorting incentives, implementation practices and thus outcomes. These distortions have been proved considerably inhibiting for individual well-being through several economic and social channels.

The literature examining the impact of corruption on economic growth has been

[6] In Japan, divorce causes the propensity to commit suicide among males to become about two times higher than that among females due to the compensation costs that males are more likely to pay to females (Yamamura, 2010).

vast. Among others Mauro (1995, 1996), provides evidence that corruption is negatively associated with growth rates of per capita income, thus hindering standards of living. In addition, Sacks, Stevenson, and Wolfers (2010) argue that economic growth increases individual self reported well-being (proxied by life satisfaction). Deteriorating living conditions, in terms of income and consumption levels, are expected to hinder utility and individual happiness levels. As happiness levels drop, depression symptoms increase and thus suicides are expected more frequently. Earlier research on the effects of growth on happiness (Easterlin 1995) reports that economic growth has no impact on self-reported happiness levels in the long run. Easterlin (1995) finds that what matters for life satisfaction levels is the relative and not the absolute level of income.

In addition, according to Mo (2001) corruption favors a particular class of people creating inequalities in opportunities (Rothstein and Uslaner 2005; You and Khagram, 2005; You 2005). This fact, directly related with productivity retardation and income inequality, creates instabilities and hampers social cohesion. As a result, due to the "unfavorable" treatment certain social classes receive, they become marginalized and fail to reach their full potential. In addition, such income inequalities interfere with the relative position of individuals in a society, thus affecting happiness. Easterlin (1974, 1995, 2003), Kasser and Ryan (1993), and Blanchflower and Oswald (2000) provide evidence that it is relative and not absolute income that matters most. Hence, income inequalities make part of the society relatively worse off, decreasing their happiness and well-being levels. For instance, Alesina et al. (2004) find that aggregate income inequality negatively affects subjective well-being in a panel of 13 developed countries between 1975 and 1996. This finding is inconsistent with Bjørnskov et al.

(2008), who conclude that income inequality is not robustly associated with self-reported well-being by employing an extreme bound analysis approach.

Helliwell and Putnam (2004) investigate the social correlates of subjective well-being. Their study reveals a positive association between a) governance quality and b) average trust, measured both at the national and the community level, on life satisfaction and self-reported happiness levels. The association between life satisfaction and aggregate governmental quality[7] measures is further investigated in detail by Helliwell (2003) and Helliwell and Huang (2008). Helliwell and Huang (2008) find a strong positive effect of government delivery mechanisms, i.e. governmental effectiveness, regulatory quality, rule of law, and control of corruption, on life satisfaction and subjective well-being. This effect appears to be stronger in countries with higher per capita income levels. For instance, other authors argue that institutional factors such as corruption levels only influence happiness levels in rich countries (Frey and Stutzer 2008; Bjørnskov et al. 2010). Their measures of governance strongly dominate per capita incomes as determinants of well-being. What is more, they investigate the relationship between a) governance quality delivery mechanisms and b) general trust and suicide rates. Their findings reveal a negative and significant relationship, for both regressors. It is important to note that for all robustness tests, aggregate governance and trust remain positive and statistically significant correlates of life satisfaction. The main interpretation behind this results could be that good governance, reflected by low levels of corruption, reduces law

[7] Aggregate governance quality is the unweighted average of the six component indexes of Kaufmann, Kraay and Mastruzzi, "Governance Matters IV: Governance Indicators for 1996-2004": voice, political stability (democratic dimensions), governmental effectiveness, regulatory quality, rule of law, and control of corruption (delivery dimensions).

enforcement costs, market transactions are facilitated and transparency makes it easier for citizens to control politicians. In this sense, good governance or the quality of institutions might increase well-being and lower suicide rates. This finding is in line with the results of Tavits (2008) who, using data for 68 countries and survey data from 16 European democracies, concludes that average happiness is lower under corrupt as opposed to clean regimes.

Life satisfaction levels can also be affected through both quality and the level of employment (Kurer 1993). In a perfectly transparent environment, employment matches happen when a position is filled with the most qualified candidate who is willing to provide his services for certain compensation. However, when distortions are present, i.e. corruption, this procedure often leads to misallocation of talent and other resources. In countries where corruption is common and the public sector is sizeable, such a misallocation of talent due to personal relationships, bribes, favors, etc. (Glaeser and Saks 2006) can lead several highly qualified candidates into unemployment or low paid jobs and low skilled individuals into highly paid jobs. Such distortions often create unfair distribution of income and other resources directly impeding quality of life and life satisfaction measures.

Corruption is argued to impede public provision of social services. According to this theory public officials exercise monopoly power and receive bribes in order to decide the quantity and quality of public services delivered. Gupta et al. (2000) show that less corruption and higher predictability of corruption are associated with higher quality of health and public services. Corruption hinders the provision of services in two ways: first, it increases the price paid, thus reducing the quantity demanded by the public, resulting in lower social welfare. Second, in the cases of "corruption with theft",

officials withhold the charges received for a service or an output, lowering government revenues. Both cases result in distorting social welfare. In the first case, higher prices and lower consumption imply reduced consumer surplus. In the second case, reduced government revenues, imply lower future public services and government expenditures. Both outcomes have critical implications for quality of life, direct and indirect, and as a consequence for happiness and life satisfaction.

In addition to quality and quantity distortions originating from corrupt practices, predatory behavior by corrupt politicians distorts the composition of government expenditure. Consequently, corruption reduces government spending on health and education (Mauro 1996; Delavallade 2006). Expenditure for both physical and mental health has substantial implications for curing health conditions. Gupta et al. (2000) find a positive relationship between corruption and i) infant and ii) child mortality rates. Moreover, expenditure on mental health care can prevent depression and hence suicide rates. In this direction, Minoiu and Andrés (2008) provide evidence that the share of public health and welfare expenditure at the state level reduces suicide rates. For example, welfare expenditures can be used as an indicator of social fairness that a given state intends to attain and therefore would influence satisfaction levels. Thus, corruption can affect suicidal events through reduction of public spending on health.

The discussion as above leads us to propose the following testable hypothesis:

Hypothesis: Public sector corruption increases suicide rates.

Data and empirical model.

We use panel data for 24 OECD countries for the period 1995-2004. As shown in the Appendix, Table A1, 24 OECD countries were included. The data comes from several sources. Annual

suicide deaths are extracted from the WHO Mortality Database (past update Dec 2009)[8] which contains information on country of origin, age group, gender, number and cause of deaths occurred. We use the corruption index compiled by the International Country Risk Guide (ICRG), where higher scores indicate less better governance quality or lower rates of corruption[9]. Some authors argue that indices based on perceptions reflect the quality of a country's institutions (Andvig 2005). Among the set of explanatory variables included are: per capita income, economic inequality, unemployment rates, divorce rates, total alcohol consumption, fertility rates, and total population. As a measure of income, we use the per capita real gross domestic product (*INCOM*) measured in 2000 international dollars taken from the Penn World Tables (PWT v 6.3)[10]. Economic inequality (*GINI*) was proxied by the Gini coefficient which comes from the Standardized Income Distribution Database (SIDD) created by Babones and Alvarez-Rivadulla (2007)[11]. The SIDD adjusts the raw World Income Inequality Database (WIID) for differences in scope of coverage, income definition, and reference unit to a nationally representative, gross income, household per capita standard. Harmonized unemployment rates (UNEMP) were taken from the OECD database to allow for comparisons across countries. We also employ crude divorce rates (per 1,000 people) (*DIV*) taken from the United Nations Common Database, Demographic Yearbook[12]. Total recorded per capita alcohol consumption (*ALCO*) is obtained from the Global Information System on Alcohol and Health (GISAH) of the World Health Organization (WHO)[13]. Total fertility rates (*FERTIL*) are taken from the World Development Indicators Database (World Bank 2006). Lastly,

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[8] Available at http://www.who.int/whosis/mort/download/en/index.html (accessed May 10, 2010).

[9] An important issue is how to define corruption. There are many definitions. Most share a common denominator which can be expressed as the abuse of public authority or position for private gains.

[10] The data are available at http://pwt.econ.upenn.edu/php_site/pwt_index.php (accessed January 15, 2010).

[11] The data are available at http://salvatorebabones.com/data-downloads (accessed March 1, 2011).

[12] Available at http://data.un.org/Default.aspx (Accessed May 10, 2010).

[13] Available at http://apps.who.int/globalatlas/default.asp (Accessed May 10, 2010).

mid-year total population (*POP*) is taken from the WHO Mortality Database.

The empirical model to explain suicide rates and analyze the impact of corruption on suicide takes the following form:

$$\text{SUICI(MSUICI, FSUICI)}_{it} = \alpha_1 \text{CORRUPT}_{it} + \alpha_2 \ln(\text{POP})_{it} + \alpha_3 \text{INCOM}_{it} + \alpha_4 \text{FERTIL}_{it} + \alpha_5 \text{GINI}_{it} + \alpha_6 \text{UNEMP}_{it} + \alpha_7 \text{DIV}_{it} + \alpha_8 \text{ALCO}_{it} + m_t + k_i + \varepsilon_{it}, \quad (1)$$

where dependent variables in country i and year t are total suicide rates as SUICI_{it} (male and female suicide rates). m_t represents unobservable year specific effects such as macro-level shock in year t. k_i and ε_{it} represent individual effects of country i (a fixed effect country vector) and the error term of country i and year t, respectively. m_t is controlled by incorporating year dummies. k_i holds the time invariant feature. So we can use the fixed effects model to capture k_i (Baltagi 2005). The fixed effects allow to control for differences in national characteristics such as culture, religious concepts about death or life across nations, climate and traditional values, and periodical characteristics such as changes in social acceptance of suicide. The regression parameters to be estimated are captured by the vector α; and ε_{it} represents the classical error term.

CORRUPT is measured on a scale from 0 to 6, with higher values denoting lower levels of corruption. If people are less likely to commit suicide in less corrupt societies, *CORRUPT* will take the negative sign. One of the reasons to employ a fixed effects model is that is a closed sample (homogenous) and we do not extrapolate these results to another set of countries. We also expect some correlation between the individual effects and some of the explanatory variables.

Following the suicide literature, we include in the regressors several socioeconomic variables(e.g. Brainerd 2001, Kunce and Anderson 2002, Andrés 2005, Chuang and Huang 2007, Chen *et al*., 2009; Noh 2009, Yamamura 2010, Andrés *et al*. 2011). To begin, economic factors were captured by per capita income (INCOM), unemployment rate (UNEMP), and Gini index (GINI). If the improvement

of economic conditions reduces suicides by raising the expected utility (Hamermesh and Soss 1974), then the sign of the first coefficient is expected to be negative. Some panel data studies have found a significant negative relationship between per capita income and national suicide rates (Lin 2006; Brainerd 2001). Hamermesh and Soss (1974) examine the effect of unemployment on suicide and find that higher unemployment rates lead to higher suicide rates. Andrés (2005) concludes that unemployment leads to both higher male and female suicide rates. Higher income equality may give people a sense of social fairness, positively enhancing their level of satisfaction. It is also argued that income inequality may simply undermine social cohesion and hinder the formation of social capital, which may in turn influence health through the pathways of crime, public assistance, individual behavioral risks and socio-economic factors (Mellor and Milyo 2001; Kawachi and Kennedy 1997). Inequality is also viewed to reduce social integration and increase psychosocial stress (Wilkinson 1996; Kawachi and Kennedy 1997). Therefore, from this perspective, suicide is expected to be positively related to economic inequality. The empirical evidence is mixed. Some studies find a significant psotively relationship between inequality and sucidie (Daly and Wilson 2006; Miniou and Andrés 2008) while others fail to find a statistically significant relationship (Andrés 2005).

With regards to social factors, it is also widely accepted that fertility rates (FERTIL) have a negative effect on suicide. The presence of children might increase parents' feelings of self-worth, possibly based on the perception of being needed. Recent studies have reported a large and negative association between aggregate fertility rate and suicide rates for males and females (Andrés 2005; Neumayer 2003b; Koo and Cox 2008). Alcohol consumption (ALCO) suggests a lack of social integration and is expected to be positively associated with suicide rates, a fact documented in Neumayer (2003a), Andrés (2005), and Chen et al. (2009) for males and Brainerd (2001) for females. Divorce rates (DIV) reduces social integration and family ties. Divorce can cause depression, stress, mental health pain, and financial problems, which might result in risky behavior

like suicide. Therefore, divorce rates are indeed positively correlated with suicides (Brainerd 2001; Chuang and Huang 2007; Daly and Wilson 2009; Minoiu and Andrés 2008; Helliwell 2007; Yamamura 2010). We also control for the corresponding total populations to account for country size[14]. Table 1 provides definitions and descriptive statistics of the variables.

It seems reasonable to assume that social position and role differ between males and females. For example, females aremore likely to spend a time on housework than males. On the other hand, males most commonly spend considerably more time in the workplace than females. Therefore, labor market conditions are different between genders. Corruption in the public sector seems to have a critical influence on labor market conditions. Hence, gender attitudes towards corruption event are expected to differ. In order to compare the effects of corruption on suicide between genders, we estimate separate models for males and females.

Estimation results

Results for total suicide rate under the fixed effects models are given in Table 2. Results for male and female suicide rates are presented in Tables 3 and 4. We begin by looking at Table 2. In all estimations, CORRUPT yields the predicted negative sign, while being statistically significant. This result remains robust across specifications. The estimation result strongly supports the hypothesis proposed earlier. Further, absolute values of the coefficient on CORRUPT range from 0.80 to 1.07. Thus, a one unit improvement in corruption index is associated with less instances of suicides of between 0.80 to 1.07 percentage points. This implies that one point increase of CORRUPT reduces suicide rate by 0.80 -1.07. With respect to other control variables, the significant negative sign of INCOM is observed in all columns, suggesting that increase of income

[14] Using adjusted suicide rates to control for differences in the structure of population is equivalent to regress the crude rate and control for age structure of population.

reduces the suicide rate. The direction of the effect is consistent with the existing literature (Brainerd 2001; Neumayer 2003a, 2003b; Chuang and Huang 1997, 2007) as well as Hamermesh and Soss' theory of suicide. Inequality (GINI), unemployment and fertility all have a negative but non statistically significant coefficient. The negative sign on FERTIL is in line with previous studies (e.g. Andrés 2005, Andrés et al. 2011). Regarding the effect of inequality, it could be the case that for OECD countries inequalities are not of great magnitude towards the bottom of the society and thus are not a significant determinant of suicides. DIV produces the positive sign and is statistically significant in columns (1) and (2), which suggests that divorce leads people to commit suicide. The positive sign of ALCO is in line with previous works (Andrés 2005; Yamamura 2010). ALCO is, however, not statistically significant.

Now we turn to Table 3 and 4 to compare results between males and females. In all columns of Table 3, the coefficient on corruption is negative and statistically significant, a result which is robust across all specifications. Further, the absolute values of CORRUPT range from 1.23 to 1.70, implying that one point increase of CORRUPT leads to decrease of suicide rate by 1.23-1.70 percentage points. The same result as above holds for the coefficient on corruption under all specifications presented in Table 4. Absolute values of coefficient of CORRUPT suggestthat an one point increase of CORRUPT leads to decrease of suicide rate by 0.38-0.56. These results imply that the impact of CORRUPT on male suicide rate is approximately three times larger than that the one for females. In our interpretation, corruption has a negative influence on labor market and in turn has a larger and more direct impact on male than female.

As for control variables, it is interesting to observe that INCOM yields the negative sign in all columns of Table 3 and is not statistically significant in columns (3)-(5) while INCOM produces the significant negative signs in all columns of Table 4. This suggests that income level is more closely associated with female suicide rate than male suicide rate. Table 3 exhibits that signs of

FERTIL are positive in column (1) and negative in columns (2)-(4) whereas Table 4 presents that signs of FERTIL are negative in all columns and statistically significant in columns (1), (2) and (4). That is, fertility rates are only statistically significant in the female suicide equation.. Following Durkheimian arguments of social integration, fertility rates increase family integration and promote social ties and are thus expected to lower societal suicide rates. This result is consistent with panel data studies at regional and cross-country levels (Rodríguez 2006). The coefficient on divorce rates has a positive sign under all specifications presented in Tables 3 and 4. However, divorce appears to be statistically significant only in the male regressions (Table 3) but not in Table 4. This is consistent with the finding of Yamamura (2010). Combined results of control variables reveal that relevant factors have different effect on suicide behavior between males and females, which appears to reflect the different socio-economic position between genders.

Conclusion

Although suicide research is a multidisciplinary subject, socioeconomic factors are well documented risk factors for suicide. Past research has neglected the role of governance quality indicators. In particular, this study explored how corruption influences suicide rate using a panel dataset for 24 OECD countries. Empirical results from the fixed effects estimation revealed that suicide rates are lower in countries with lower levels of corruption even after various socio-economic factors are controlled for. This result remains robust across specifications. Furthermore, the coefficient on corruption is larger for males than for females From this, we derive the argument that reduction of government expenditure for mental and psychological health care caused by corruption has a greater influence on social well-being for males rather than females.

We find the different effect of corruption on suicide rate between genders. We, however, do

not explore the reason why the effect of corruption differs between males and females. For such purpose, individual rather than aggregate data should be used. This issue remains to be addressed in future work.

REFERENCES

Alesina, A., Di Tella, R. & MacCulloch, R. (2004). Inequality and happiness: Are Europeans and Americans different? *Journal of Public Economics, 88,* 2009-2042.

Anbarci, N., Escaleras, M., & Register, C.A. (2006). Traffic fatalities and public sector corruption. *Kyklos*, 59(3), 327-344.

Anbarci,N., Escaleras,M. & Register, C.A. (2009). The ill effects of public sector corruption in the water and sanitation sector, *Land Economics, 85(2),* 363-377.

Andrés, A.R. (2005). Income inequality, unemployment, and suicide: a panel data analysis of 15 European countries. *Applied Economics*, *3,* 439-451.

Andrés, A.R., Halicioglu, F., & Yamamura, E. (2011). Socio-economic determinants of suicide in Japan. forthcoming in *Journal of Socio-Economics.*

Andvig, J.C. (2005). A House of Straw, Sticks or Bricks. Some Notes on Corruption Empirics, Paper presented at the IV Global Forum on Fighting Corruption and Safeguarding Integrity, June 2005.

Babones, S.J., & Alvarez-Rivadulla, M.J. (2007). Standardized income inequality data for use in cross-national research. *Sociological Inquiry, 77*, 3-22.

Baltagi, B. (2005). *Econometric Analysis of Panel Data,* John Wiley and Sons.

Bertrand, M., & Mullainathan, S. (2001). Do people mean what they say? implications for subjective survey data. *American Economic Review*, *91(2)*, 67–72.

Bjørnskov, C., Dreher, A. & Fischer, J. (2008). Cross-country determinants of life satisfaction: Exploring different determinants across groups in society. *Social Choice and Welfare, 30,* 119-173.

Bjørnskov, C., Dreher, A. & Fischer, J. (2010). Formal institutions and subjective well-being. Revisiting the cross country evidence. *European Journal of Political Economy, 26,* 419-430.

Blanchflower D.G. & Oswald A.J. (2000). Well-being over time in Britain and the USA. NBER Working Papers 7487, National Bureau of Economic Research, Inc.

Brainerd, E. (2001). Economic reform and mortality in the former Soviet Union: A study of the suicide epidemic in the 1990s. *European Economic Review*, *45,* 1007-1019.

Chen, J., Choi Y.J., & Sawada, Y. (2009). How is suicide different in Japan? *Japan and the World Economy 21(2)*, 140-50.

Chuang, H.L, & Huang, W.C. (2007). A Re-examination of the suicide rates in Taiwan. *Social Indicators Research*, *83(3),* 465-485.

Delavallade, C. (2006). Corruption and distribution of public spending in developing countries. *Journal of Economic Finance*, *30,* 222-239.

Daly M, & Wilson, D.J. (2009). Happiness, unhappiness and suicide: an empirical assessment. *Journal of European Economic Association, 7,* 539-549.

Durkheim, E. (1966). Suicide. New York: Free Press.

Easterlin, R.A. (1974). Does economic growth improve the human lot? in Paul A. David and Melvin W. Reder, eds., Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz, New York: Academic Press, Inc.

Easterlin, R.A. (1995). Will raising the incomes of all increase the happiness of all? *Journal of Economic Behavior and Organization*, *27(1),* 35-48.

Easterlin, R.A. (2003). Explaining Happiness. Proceedings of the National Academy of Sciences, 100:19, September 16, 11176-11183.

Escaleras, M., Anbarci, N., & Register, C.A. (2007). Public sector corruption and major earthquakes: A potentially deadly interaction. *Public Choice, 132(1),* 209-230.

Fischer, J.A.V., & Rodríguez, A. (2008). Political institutions and suicide: A regional analysis of Switzerland. TWI Research Paper. Universitat Konstanz.

Frey, B. & Stutzer, A. (2000). Happiness, economy and institutions. *Economic Journal, 110,* 918-938.

Glaeser, E.L. & Saks, R.E. (2006). Corruption in America. *Journal of Public Economics, 90,* 1053-1072.

Gupta S., Davoodi, H., & Tiongson E. (2000). Corruption and the provision of health care and education services. IMF Working Paper WP/00/116.

Hamermersh, D. S. (1974). The economics of black suicide, *Southern Economic Journal, 41,* 188-99.

Hamermersh, D. S., & Soss, N.M. (1974). An economic theory of suicide. *Journal of Political Economy, 82*, 83-98.

Helliwell, J.F. (2007). Well-being and social capital. Does suicide post a puzzle? *Social Indicators Research*, 455-496.

Helliwell, J.F., & Huang, H. (2008). How's your government? International evidence linking good government and well-being. *British Journal of Political Science, 38*, 595-619.

Helliwell, J.F., & Putnam, R.D. (2004). The social context of well-being. *Philosophical Transactions of the Royal Society*, *359,* 1435-1446.

Kahn, M.E. (2005). The death toll from natural disasters: the role of income, geography, and institutions. *Review of Economics and Statistics, 87,* 271-284.

Kasser, T., & Ryan, R. M. (1993). A dark side of the American dream: correlates of financial success as a central life aspiration. *Journal of Personality and Social Psychology, 65,* 410-422.

Kawachi, I. & Kennedy, P.B (1997). Health and social cohesion: Why care about income inequality? *British Medical Journal*, 314, 1037-1040.

Koivumaa-Honkanen, H., Honkanen, R., Viinamki, H., Heikkil, J., Kaprio, J., & Koskenvuo M. (2001). Life satisfaction and suicide: a 20-year follow-up study. *The American Journal of Psychiatry, 158,* 433-459.

Kunce, M., & Anderson, A.L. (2002). The impact of socio-economic factors on state suicide rates: A methodological note. *Urban Studies, 39,* 155-162.

Kurer O. (1993). Clientelism, corruption, and the allocation of resources. *Public Choice, 77,* 259-273.

Mauro, P. (1995). Corruption and growth. *The Quarterly Journal of Economics, 110(3),* 681-712.

Mauro, P. (1996). The effects of corruption on growth, investment, and government expenditure. IMF Working Papers 96/98, International Monetary Fund.

Mauro, P. (1998). Corruption and the composition of government expenditure. Journal of Public Economics 69, 263-279.

Mellor, J.M. & Milyo, J. (2001). Re-examining the ecological association between income inequality and health, *Journal of Health Politics, Policy and Law*, 26, 487-522.

Minoiu, C., & Andrés, A.R. (2008). The effect of public spending on suicide: Evidence from US state data. *Journal of Socio-Economics*, *37(1)*, 237-261.

Mo, P.H. (2001). Corruption and economic growth. *Journal of Comparative Economics*, *29*, 66-79.

Neumayer, E. (2003a). Socioeconomic factors and suicide rates at large unit aggregate levels: A comment. *Urban Studies*, 40, 2769-2776.

Neumayer, E. (2003b). Are socioeconomic factors valid determinants of suicide? Controlling for national cultures of suicide with fixed effects estimation. *Cross-Cultural Research*, 37, 307-329.

Noh, Y.H. (2009). Does unemployment increase suicide rates? The OECD panel evidence. *Journal of Economic Psychology, 30,* 575-582.

Ott, J.C. (2010). Good governance and happiness in nations: Technical quality precedes democracy and quality beats size. *Journal of Happiness Studies, 11,* 353-368.

Rodríguez, A. (2006). Inequality and suicide mortality: a cross country study. Development Research Working Paper Series 13/2006, Institute for Advanced Development Studies.

Rothstein, B., & Uslaner E.M. (2005).Equality, corruption, and social trust. *World Politics, 18,* 1, 41-72.

Tavits, M. (2008). Representation, corruption, and subjective well-being.*Comparative Political Studie*s, 41(6), 1607-1630.

Wilkinson, R.G. (1996). *Unhealthy Societies: The Afflictions of Inequality*. Routledge: London

World Bank. (2006). *World Development Indicators,* CD-ROM, Washington, DC: World Bank.

Yamamura, E. (2010). The different impacts of socio-economic factors on suicide between males and females. *Applied Economics Letters, 17,* 1009–1012.

You J.S. (2005). Corruption and inequality as correlates of social trust: Fairness matters more than similarity. The Hausen Center for Nonprofit Organizations and The John F. Kennedy School of Government, Harvard University, Working Paper No. 29.

You, J.S., & Khagram, S. (2005). A comparative study of inequality and corruption. *American Sociological Review,* 70, 1, 136-157.

Table 1
Variable definitions, means, and standard deviations (N = 102).

Variables	Definition	Mean	Standard Deviation
SUICI	Suicide rate (per 100,000)	14.5	6.4
MSUICI	Male suicide rate (per 100,000)	21.4	9.4
FSUIC	Female suicide rate (per 100,000)	7.8	4.1
CORRUPT	Degree of corruption	4.6	1.0
ALCO	Recorded adult per capita alcohol consumption (in liters)	10.7	3.0
GINI	Gini coefficient	0.42	0.11
INCOM	Per capita income ($1000 US)	23.2	7.0
UNEMP	Unemployment rate (%)	7.4	3.6
DIV	Crude divorce rate (per 1,000; %)	2.0	0.9
FERTIL	Fertility rate, total (births per woman)	1.6	0.2
POP	Mid-year population (millions)	37.2	58.9

Table 2

Determinants of total suicide rate: Panel data regression models. Fixed effects models (1995-2004).

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CORRUPT	-0.83**	-0.80**	-1.07**	-0.97**	-1.05**	-1.06**	-1.06**
	(-2.38)	(-2.27)	(-2.77)	(-2.37)	(-2.50)	(-2.27)	(-2.29)
Ln(POP)	25.7**	23.1*	22.6	21.3	18.2	1.48	
	(2.31)	(1.86)	(1.50)	(1.51)	(1.50)	(0.12)	
INCOM	-0.32*	-0.27**	-0.28*	-0.25*	-0.27*		
	(-1.98)	(-2.12)	(-1.89)	(-1.75)	(-1.86)		
FERTIL	-1.19	-1.86	-2.55	-1.59			
	(-0.44)	(-0.65)	(-0.75)	(-0.48)			
GINI	-0.27	-0.76	3.76				
	(-0.10)	(-0.26)	(0.58)				
UNEMP	0.06	0.05					
	(0.49)	(0.38)					
DIV	2.46**	2.26**					
	(2.11)	(2.11)					
ALCO	0.34						
	(0.83)						
R-squared (Within)	0.35	0.34	0.33	0.25	0.17	0.13	0.13
No. of observations	184	184	199	208	234	234	234

Note: Numbers in parentheses are t-statistics calculated by calculated by using robust standard errors adjusted for within-nation clustering. * and **indicate significance at 10 and 5 percent levels, respectively. Country and year dummies are included in all estimations, but to save space are not reported. In each column, the sample size may vary across different specifications due to data availability.

Table 3

Determinants of male suicide rate: Panel data regression models. Fixed effects models (1995-2004).

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CORRUPT	-1.29**	-1.23**	-1.70**	-1.52**	-1.58**	-1.60**	-1.59**
	(-2.47)	(-2.34)	(-2.78)	(-2.35)	(-2.49)	(-2.26)	(-2.29)
Ln(POP)	33.1	28.6	26.9	22.6	17.9	-7.71	
	(1.55)	(1.24)	(1.01)	(0.91)	(0.86)	(-0.36)	
INCOM	-0.49*	-0.41*	-0.44	-0.39	-0.41		
	(-1.70)	(-1.79)	(-1.59)	(-1.45)	(-1.55)		
FERTIL	0.07	-1.06	-2.76	-0.32			
	(0.02)	(-0.22)	(-0.46)	(-0.05)			
GINI	0.18	-0.63	4.44				
	(0.03)	(-0.11)	(0.48)				
UNEMP	0.20	0.17					
	(0.84)	(0.74)					
DIV	4.57**	4.23**					
	(2.48)	(2.54)					
ALCO	0.58						
	(0.87)						
R-squared (Within)	0.38	0.37	0.30	0.22	0.16	0.12	0.12
No. of observations	184	184	199	208	234	234	234

Note: Numbers in parentheses are t-statistics calculated by calculated by using robust standard errors adjusted for within-nation clustering.. * and ** indicate significance at 10 and 5 percent levels, respectively. Country and year dummies are included in all estimations, but to save space are not reported. In each column, the sample size may vary across different specifications due to data availability.

Table 4

Determinants of female suicide rate: Panel data regression models. Fixed effects models (1995-2004).

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CORRUPT	-0.40*	-0.38*	-0.47**	-0.45**	-0.54**	-0.55**	-0.56**
	(-1.95)	(-1.89)	(-2.46)	(-2.24)	(-2.35)	(-2.16)	(-2.15)
Ln(POP)	19.1***	18.3***	18.7***	20.4***	18.9***	10.3*	
	(4.91)	(4.04)	(3.06)	(3.44)	(3.25)	(1.70)	
INCOM	-0.16***	-0.14***	-0.13***	-0.13**	-0.13**		
	(-3.15)	(-3.12)	(-2.92)	(-2.70)	(-2.78)		
FERTIL	-2.47*	-2.67*	-2.39	-2.93**			
	(-1.74)	(-1.85)	(-1.67)	(-2.17)			
GINI	-0.69	-0.84	3.04				
	(-0.49)	(-0.61)	(0.77)				
UNEMP	-0.06	-0.06					
	(-0.94)	(-1.05)					
DIV	0.45	0.39					
	(0.81)	(0.72)					
ALCO	0.10						
	(0.57)						
R-squared (Within)	0.21	0.25	0.31	0.28	0.15	0.12	0.10
No. of observations	184	184	199	208	234	234	234

Note: Numbers in parentheses are t-statistics calculated by calculated by using robust standard errors adjusted for within-nation clustering. *, ** and *** indicate significance at 10, 5 and 1 percent levels, respectively. Country and year dummies are included in all estimations, but to save space are not reported. In each column, the sample size may vary across different specifications due to data availability.

APPENDIX.

Table A1. OECD countries in the regression analysis

Australia	Japan
Austria	Luxembourg
Belgium	Netherlands
Canada	New Zealand
Denmark	Norway
Finland	Portugal
France	South Korea
Germany	Spain
Greece	Sweden
Iceland	Switzerland
Ireland	United Kingdom
Italy	United States